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### THESIS

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AN ANALYSIS OF ENLISTED EARLY SEPARATIONS  
UNDER THE AIR FORCE'S AND NAVY'S VSI/SSB  
PROGRAMS: A COMPARATIVE STUDY

by

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March 1994

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A Comparative Study

by

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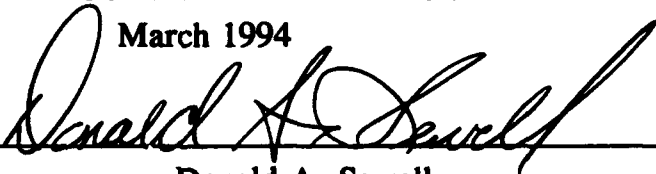
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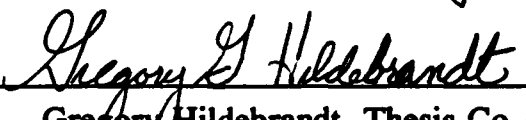
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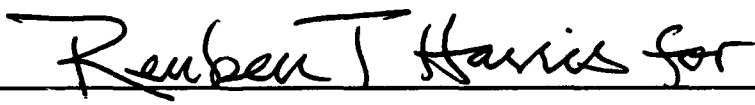
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## ABSTRACT

This thesis investigates the behavior of Air Force enlisted personnel who were eligible for early voluntary separation under one of two monetary incentive programs during FY92. The two programs were the VSI (Voluntary Separation Incentive) and the SSB (Special Separation Bonus). The thesis uses data provided by the Defense Manpower Data Center on eligible enlisted Air Force personnel for FY92. The objectives of the thesis are: (1) to identify the factors that influence the voluntary separation decision; (2) to identify the factors that influence the choice decision between the two programs; and (3) to compare FY92 Air Force results in this thesis with FY92 Navy results to determine if the same factors are consistent for both branches. Multivariate logit models were estimated to explain the decision to accept a voluntary separation incentive and the decision, among acceptors, of which program to accept. Recommendations regarding future implementation of the separation programs and for future research are provided.

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## **INTRODUCTION**

### **A. BACKGROUND**

#### **1. Purpose of Thesis**

The beginning of fiscal year 1992 marked the onset of a major policy change for the armed forces of the United States. This change was the use for the first time of 'exit bonuses.' The headlines for the January 13, 1992 issue of Navy Times read as follows; "EXIT BONUSSES, 4,100 sailors, 965 Marines could qualify in 1992. Services told to offer payments before making force-outs." The headlines for the February 10, 1992 issue of the Air Force Times read: "EXIT BONUS OR RIF?" These exit bonuses later became known as the Voluntary Separation Incentive (VSI) and the Special Separation Bonus (SSB) Programs. Submitted by personnel service planners, approved and accepted by the Department of Defense, these programs were contained in the 1992 National Defense Authorization Act as an important policy tool of DoD's force reduction strategy.

As a result of the FY92 National Defense Authorization Act, the Department of Defense faced a large scale personnel strength reduction. The bonus programs were implemented in an effort to achieve the required 15 percent drawdown by FY95 and avoid involuntary separations. The expected result of the programs was to persuade selected members to resign before

becoming retirement eligible. Both programs have since become important policy tools of DoD's overall efforts to meet the desired force strength and, in the case of some services, to establish a desired force structure.

This thesis provides an analysis of the results obtained by the Air Force from the initial offerings of the two programs to eligible enlisted service members. The thesis specifically models the factors that influence members' decisions to voluntarily leave the Air Force. There is also a comparison of the response of Air Force and Navy enlisted personnel voluntary separations to the VSI/SSB program.

## **2. The Structure of the VSI/SSB Program**

VSI/SSB was designed to offer monetary incentives to mid-careerist to entice them to leave before a possible involuntary separation. Given that there was little experience with this kind of incentive, DoD had many concerns. One of course, was the concern with how successful the incentive programs would be in inducing separations. Given the high unemployment rate in many regions of the country, officials worried that they would not be able to induce the required number of members to leave the traditionally secure military. On the other hand, planners worried that a potential improvement in the economy would cause too many service members to leave the military. A drastic improvement in the economy coupled with the denial of a member's request to voluntarily separate under one of the programs, due to



criticality of their specialty, would then result in having to be ready to promise a minimum twenty year career to some service members after first being told that they were eligible [Ref. 1:p. 13].

The Department of Defense was given authorization to use both the VSI and SSB programs to achieve the desired drawdown. DoD established the following eligibility criteria for VSI/SSB:

1. Service member must have completed the initial term of enlistment including extensions;
2. Service member must have served on active duty for more than six years, prior to 5 December 1992;
3. Service member must have served at least five years of continuous active duty immediately preceding the date of separation;
4. Service member must have served on active duty, upon separation, for less than twenty years and not be eligible for retired or retainer pay;
5. Service member must be a regular or a reservist on the active duty list.

### **3. Air Force Implementation**

At the onset of DoD's force reduction strategy, the Air Force, unlike some of the other branches of the Armed Services, was facing the possibility of implementing a RIF(Reduction in Force), that is an involuntary separation, to meet end strength goals. The implementation of VSI/SSB encouraged those service members most vulnerable to the potential RIF to accept one of the two programs. The Air Force utilized enlisted specialty codes, as well as pay grade

and years of service as the criteria for the exit bonuses. These same criteria were used as a measure of vulnerability to a RIF, as some specialty codes were decreasing in importance to the Air Force structure. The exit bonuses were targeted to E-4s and E-5s with at least nine years of service [Ref. 2:p. 3].

The specialty codes included in the eligible group encompassed a wide range, from the most critical and undermanned to those that were over-manned due changes in force structure and mission. The first tier (most critical) of specialty codes were ineligible to apply for a separation program, but were also exempt from a possible RIF. Those in the second tier of specialty codes were encouraged to take advantage of the exit bonuses. Everyone from the second tier codes through the fifth tier were encouraged to apply for one of the bonuses, as the chances of RIF increased with the tier number. [Ref. 2:p. 3]

The majority of the bonuses were offered to sergeants and staff sergeants with nine to 19 years of service. This same pay grade with nine to fourteen years of service also would have been the targets for RIF, if implemented.

## **B. THESIS OBJECTIVES**

In an effort to meet required end strength reductions, decision makers were forced to stop and realize that their efforts could drastically change the lives of those who

originally had volunteered to serve their country and who were now in mid-career. The current drawdown is the largest since the end of the Vietnam War and the initiation of the All-Volunteer Force in 1973. Manpower planners faced a critical stage as the Air Force had to eliminate personnel who

...were led to believe that if they performed in a satisfactory manner, they would be allowed to complete a normal career and retire with an immediate pension [Ref. 3:p. 127].

However the reality of the diminished Soviet threat and reduced defense spending forced reductions in manpower. The Air Force has many tools in which to accomplish this task and still maintain the integrity of the military, not only in its service member's eyes, but also in the eyes of the public. This thesis focuses on one method used by the Air Force, separation incentives, namely the Voluntary Separation Incentive(VSI) and the Special Separation Bonus(SSB). The analysis of the thesis focuses on enlisted Air Force personnel who were eligible for the VSI/SSB program during FY92. The thesis analyzes the factors that influence the acceptance decision and compares the results for Air Force personnel with those results found for Navy personnel.

### **C. THESIS QUESTIONS**

The primary concern of the thesis deals with determining which factors significantly influence an individual's decision to accept a voluntary separation incentive program. Other concerns include:

1. What differences exist in the effects of the determinants of separation between Air Force and Navy enlisted personnel eligible for VSI/SSB?

2. Are there variables that can be used to develop a valid forecasting model of the "take-rate" for future offerings of the two programs?

3. Are the VSI and SSB programs successful and cost effective force shaping tools?

4. Could the future use of VSI and SSB, beyond FY95, be successful considering its past success and the characteristics of future groups who may become eligible?

Questions 1 and 2 are addressed in Chapters III and IV.

General observations about questions 3 and 4 are found in the conclusions chapter.

#### **D. METHODOLOGY**

The data for the population of bonus eligibles for enlisted Air Force personnel were obtained from the Defense Manpower Data Center (DMDC). The data set was created by combining the set of Air Force enlisted personnel who were eligible for the VSI/SSB offerings in FY92 with information on individuals who were approved and accepted separation under one of the separation incentive programs.

A multivariate data analysis was performed to study the effects of the factors that influence the decision of enlisted Air Force personnel to stay or voluntarily separate under an incentive program, and also to measure the independent effect of each variable on the stay or leave decision. The results of the analysis for Air Force personnel was compared to Navy personnel. The dependent variables in the analysis measure

each individual's decision of whether to participate in one of the two programs, and also which program to select. The independent variables used are socioeconomic variables reflecting one's potential earnings under the military and civilian options. That is, the variables attempt to capture the service member's cost of leaving in the face of a separation bonus.

#### **F. ORGANIZATION OF STUDY**

Chapter II provides a detailed literature review establishing the theoretical framework for the thesis. Various studies of retention, strength reductions, reenlistment bonuses and downsizing are reviewed to analyze similarities and differences in the factors used in these studies, and to determine the factors affecting the decision behavior for the two incentive programs. Chapter III explains the methodology applied in the thesis, describes the data and develops the research questions.

Chapter IV analyzes the factors affecting the separation bonus decision. Included in this chapter is a comparative analysis of the take-rates of VSI/SSB between Air Force and Navy enlisted personnel. This chapter also contains an interpretation of model estimates and the predictive accuracy of the models. Chapter V summarizes the conclusions from the modeling results. This chapter cites those variables having significant effect on take-rates and the predictive accuracy

of the model. Strengths, weaknesses and recommendations for future study conclude the thesis.

## **II. LITERATURE REVIEW**

### **A. DISCUSSION**

As previously stated and emphasized in the introduction, at the beginning of the drawdown, the Department of Defense faced an extremely difficult task in reaching the desired end strength reductions. This task is '180° out' from the emphasis on retention and attrition which began with the advent of the All-Volunteer Force (AVF) in 1973 and the sustained build up during the 1980's. During the 1980s, military planners realized that manpower requirements could not be met without increasing reenlistments and reducing attrition. Now, with the emphasis on downsizing of the force, planners encountered much difficulty on reaching the desired goals. This reduction of the armed forces was inevitable. Politicians were determined to make large cuts in defense even before the fall of the Soviet Union. The level of defense funding in the 1980s, approximately six percent of GNP, was no longer acceptable. [Ref. 3:p. 4]

Shaping size has actually been an ongoing process. Voluntary separation has been the mechanism to maintain force sizes. Due to the fact that involuntary separations are politically unacceptable, manpower planners and analysts were forced to direct their attention to the study of separation

behavior and the potential effects of separation incentive policies on voluntary turnover.

#### **B. REVIEW OF VOLUNTARY TURNOVER STUDIES**

Stolzenberg and Winkler (1983), in their studies concerning causes of voluntary terminations from the military and the civilian labor force, made an effort to determine which factors (variables) best explain "quit" behavior. Their findings concluded that although pecuniary factors influence the decision to leave the military service, the non-pecuniary factors exceed the influence of pay and benefits on the decision to leave. The complex nature of the military's pay and/or compensation system makes its influence on voluntary separations difficult to identify. Service members tend to underestimate their true compensation, due to the complexity of the system. This promotes difficulty in assessing total effect of compensation on the quit decision. [Ref. 5:p. 41] The author also found that first-term enlisted personnel consider their current pay to be of more importance than non-pecuniary factors, which are considered to be of more importance to career personnel. In a comparison of lump-sum bonus payments and equivalent funds paid out in installments, military personnel tend to favor the lump-sum bonus payment. [Ref. 5:p. 61]

In the authors' conclusions, job security is a major



factor in reducing voluntary turnover from the military. Given the time frame of their study, prior to the current downsizing, job security was not an issue. Service members felt quite secure in the military as a constant source of income, a full career and substantial retirement benefits. It was a given that the military could not only promise these incentives, but also deliver them. However, the drawdown has created a great deal of uncertainty amongst service members. With this in mind, members are less secure concerning their careers and are taking long hard looks at the benefits of leaving and weighing this against the likelihood chances of being able to stay.

One major factor in a member's decision to leave is his or her marketability and chances of finding a comparable job (pay), in the civilian sector. Lakhani, Hyder (1988) conducted a three stage least squares analysis of 1981 U.S. Army data relating "quit rates," to retention bonuses and military pay in combat MOSs and non-combat MOSs [Ref. 6]. Lakhani hypothesized that soldiers in combat occupations receive specialized training, while soldiers in non-combat occupations receive more generalized training, which is readily transferable to the civilian sector. This would encourage a higher reenlistment response to bonuses by soldiers in combat MOSs. However, combat MOSs have higher pecuniary costs than that of non-combat MOSs, due to physical labor and danger. Subsequently, leave rates are expected to

be higher. On the other hand, skills gained by soldiers in combat fields are not as marketable as those attained in non-combat fields in the civilian sector. Assuming this to be true leaves two questions that each soldier must answer in weighing the separation decision: Am I marketable? If so, How much am I worth?

Since marketability does not necessarily equate to high civilian earnings, a service member may decide to remain on active duty, and not accept a separation incentive. Given the range in years of service, from nine to nineteen, this type of thinking probably differs greatly between service members. Younger members would most likely accept the lump sum, in hopes of going to college and furthering their education. More senior members would most likely accept the annuity, with their attention directed towards starting a second civilian career. Based on human capital theory, as these senior members enter the civilian labor market they would be willing to allocate (invest) part of their time and effort to the production of skills (i.e., training or formal education). This tends to lower observed earnings initially, but increase earnings in the future. Therefore, human capital theory implies that investment in learning directly steepens the slope of the age/earnings profile.

#### **C. ACOL (ANNUALIZED COST OF LEAVING) MODEL**

The U.S. Army Research Institute for the Behavioral and

Social Sciences (ARI) performed an analysis examining soldiers' responses to the two programs (VSI and SSB) and identified factors affecting soldiers' decisions to separate. The analysis used data from the Survey of Total Army Military Personnel (STAMP), which was mailed to 51,000 active and reserve soldiers after Operation Desert Shield/Storm. STAMP covered many topics including, morale, leadership, training, organizational commitment, career plans, training, adequacy of mobilization, and reactions to personnel policies such as VSI. Since STAMP's topic coverage was so broad, the data supported assessment of soldiers' reactions to separation incentives and their responses to variables in the Annualized Cost of Leaving Model (ACOL). After examining correlations between ACOL variables and separation incentives, the following conclusions were drawn to evaluate alternative Army reenlistment models: (1) Reenlistment models are a sound bases for understanding members' decisions about early separation incentives, (2) years of service and rank relate significantly to members' separation decisions, and (3) members' race and gender do not affect their decisions. [Ref. 7]

ACOL Model states that for an individual with  $t$  years of service, the returns or benefits for remaining with the military for  $s$  additional years are:

$$RS_t = \sum_{j=t}^{t+s} d^{j-t} M_j + d^{s+1} [R_{t+s} + W_{t+s}]$$

where:  $RS_t$  is the expected present value of income from an additional  $s$  years with the military;

$M_j$  is military pay in year  $j$ ,  $j=t, \dots, t+s$ ;

$R_{t+s}$  is the expected present value of retirement income for serving  $t+s$  years;

$W_{t+s}$  is the expected present value of civilian income after serving  $t+s$  years; and

$d$  is  $1/(1+p)$  where  $p$  is the individual's rate of time preference. [Ref. 11:p. 25]

In comparison to the returns from staying in the military there are also returns from leaving (RL), immediately. These returns can be stated as:

$$RL = R_t + W_t$$

where  $R_t$  and  $W_t$  are the present value of retirement income and civilian wages, respectively, for leaving at time  $t$ . The stay or leave decision is based on a comparison of  $RS$  and  $RL$ . If  $RS > RL$ , the benefits from staying outweigh the benefits from leaving, thus a rational decision can be made to reenlist.

Thus far, the model has not taken into account non-pecuniary factors. Let  $k$  equal a measure of the individual preference for the non-pecuniary aspects of military versus civilian life. In this case the reenlistment decision can be thought of as;

$$RS + k > RL$$

If total financial and non financial benefits are greater than the financial benefits of leaving the military, the individual will reenlist. Note that the financial benefits from leaving could exceed those from staying, but the individual could

still make the decision to reenlist because  $k$  indicates a positive attitude toward army life.

Placing the ACOL model in perspective, the following model specification represents a service member in tiers 2 and 3, (eligible for an exit bonus, and not likely to get forced out in the event of a RIF). This presents a problem in considering what it would cost someone who would otherwise make a positive decision,  $RS+k>RL$ , to leave the military. There is a financial cost of leaving (COL) which can be defined as:

$$COL = RS - RL$$

For someone in this situation to leave the military, they would have to be offered an early financial separation incentive (ESI), that is greater than their COL.

$$ESI > RS - RL$$

If non-pecuniary factors are considered, then;

$$ESI > RS - RL + k$$

Realizing that at the time an offer is made there is no retirement benefit applicable, the return obtained from a person deciding to leave can be stated as follows;

$$RL = W; \text{ since } R = 0 \text{ and}$$

$$ESI > RS - W + k$$

#### **D. DEPARTMENT OF DEFENSE PLAN**

The proposed and approved cuts in military personnel are drastic. With the enactment of VSI/SSB and possible force-

outs, the Defense Department by 1995, will have reduced the active duty force to approximately 1.6 million sailors, soldiers, airmen, and Marines. From peak strength in 1987, this figure will be down by 530,000. [Ref. 4:p. 64] Table 2-2 displays the end strength for each branch. The offering of the two programs differed widely in size and focus across the services. This was mainly due to varying rates of progress towards the 1995 drawdown. The Air Force had previously met its reduction goals with the use of various personnel reduction tools. But if deeper reductions were ordered, force-outs (involuntary separations), would become almost unavoidable.

Involuntary separation is a technical term, says Lt. Gen. Billy J. Boles, USAF deputy chief of staff for Personnel. Many of the people who are taking VSI or SSB want to stay in the Air Force, but they understand that if they stay, they are very likely to be forced out with less compensation than if they leave voluntarily. [Ref. 8:p. 7]

Projected extensive budget cuts in National Defense spending, with the most significant cut directed towards the Department of Defense, is the driving force in personnel reductions. Table 2-1 displays predicted defense spending levels.

**TABLE 2-1**  
**PREDICTED DEFENSE SPENDING, 1993-1998**  
**(Billions)**

<b>Budget Authority</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
DOD Military	259.1	250.7	248.1	240.3	232.8	240.5
DOE & Other	13.9	12.7	13.0	13.4	13.2	13.4
Total	273.0	263.4	261.1	253.7	246.0	253.9
Annual Percent Change (1993 Dollars)	-8.5	-5.0	-3.0	-5.1	-5.0	0.0

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<b>Outlays</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
DOD Military	277.3	264.2	258.0	251.6	233.7	239.2
Total	290.7	276.9	270.9	264.7	246.9	252.5
Annual Percent Change (1993 Dollars)	-5.6	-6.6	-4.3	-4.5	-8.9	0.0

Source: Secretary of Defense DOD press release, 27 March 1993

These dollar cuts explain the projected personnel drawdown as seen in Table 2-2. Although Table 2-2 may be outdated, seeing that it dates back to 1987, its' projections are most relevant to the VSI/SSB decision being analyzed.

**TABLE 2-2**  
**PROJECTED MANPOWER CUTS, 1987-1995**  
**AND 1987-1997**  
**(End strength in thousands)**

	<b>FY 1987</b>	<b>Change, 1987-95</b>	<b>FY 1995</b>	<b>FY 1997</b>	<b>FY 1987-97</b>
<b>Total active-duty</b>	<b>2,174</b>	<b>-530</b>	<b>1,644</b>	<b>1,626</b>	<b>-548</b>
Air Force	607	-178	429	430	-177
Army	781	-245	536	536	-245
Marine Corps	199	-29	170	159	-40
Navy	587	-78	509	501	-86
<b>Selected Reserves</b>	<b>1,151</b>	<b>-229</b>	<b>922</b>	<b>920</b>	<b>-231</b>
<b>Civilians</b>	<b>1,133</b>	<b>-221</b>	<b>912</b>	<b>904</b>	<b>-229</b>

Source: Air Force Magazine / April 1992

As outlined by the fiscal year 1992 National Defense Authorization Act, those members qualified for and approved for voluntary separation faced the decision as to which payment benefit option they would accept in exchange for voluntary leaving active duty. What follows is an overview of the two programs.

The Voluntary Separation Incentive(VSI) program provides an annuity type payment based on the following formula:

(final month's  
Annual VSI amount =(2.5 percent) x base pay) x (12) x (YOS)  
(where the total number of payments is equivalent to twice the  
member's years of service.)

Under the VSI option, the service member is obligated to serve in the Ready Reserves for as long as the period of the VSI payments. VSI payments are also affected by any military retirement or reserve drill pay, which is deducted from VSI. The Special Separation Bonus(SSB) program provides a lump sum cash payment based on the following formula:

(final month's  
Total SSB payment = (15 percent) x base pay) x (12) x (YOS)

Under the SSB option, the service member is obligated to serve three years in the Ready Reserves. Also, SSB recipients will have to pay back certain amounts at the time military retirement payments begin.

Table 2-3 provides a comparison of dollar value



amounts by paygrade(E-4 to E-7) and YOS (nine to fourteen years) for the lump-sum versus the annuity. Also included are present value calculations for each paygrade at each year point. To provide a reasonable comparison of the two programs' current dollar values, a seven percent rate of interest was used.

**Table 2-3**  
**PRESENT VALUE OF LUMP-SUM (SSB) VERSUS**  
**ANNUITY (VSI) SEPARATION BONUS**

<u>Paygrade</u>	<u>Years of Service</u>					
	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>
<u>E-4</u>						
<b>SSB</b>	<b>19,702</b>	<b>21,892</b>	<b>24,081</b>	<b>26,270</b>	<b>28,459</b>	<b>30,648</b>
<b>VSI</b>						
Annual	3,284	3,649	4,013	4,378	4,743	5,108
# of Years	18	20	22	24	26	28
Total	59,107	72,972	88,296	105,080	125,323	143,025
Present Value	35,344	41,359	47,501	53,732	60,018	66,337
<u>E-5</u>						
<b>SSB</b>	<b>22,283</b>	<b>25,742</b>	<b>28,316</b>	<b>32,024</b>	<b>34,693</b>	<b>38,042</b>
<b>VSI</b>						
Annual	3,714	4,290	4,719	5,337	5,782	6,340
# of Years	18	20	22	24	26	28
Total	66,849	85,806	103,825	128,097	150,336	177,529
Present Value	39,973	48,633	55,856	65,501	73,165	82,340
<u>E-6</u>						
<b>SSB</b>	<b>24,456</b>	<b>28,172</b>	<b>30,989</b>	<b>35,549</b>	<b>38,512</b>	<b>42,774</b>
<b>VSI</b>						
Annual	4,076	4,695	5,165	5,925	6,419	7,129
# of Years	18	20	22	24	26	28
Total	73,367	93,906	113,625	142,197	166,884	199,614
Present Value	43,870	53,224	61,128	72,711	81,219	92,583
<u>E-7</u>						
<b>SSB</b>	<b>27,624</b>	<b>31,676</b>	<b>34,844</b>	<b>39,198</b>	<b>42,464</b>	<b>47,802</b>
<b>VSI</b>						
Annual	4,604	5,279	5,807	6,533	7,077	7,967
# of Years	18	20	22	24	26	28
Total	82,873	105,588	127,761	156,790	184,011	223,075
Present Value	49,554	59,845	68,733	80,173	89,554	103,465

Source: Department of Defense office of compensation

\* Discount rate used to calculate present value is 7 percent

As denoted by the highlighted figures, the present value of VSI payments greatly exceed the lump-sum value of SSB. Nonetheless SSB, as will be discussed later, was the more popular of the two.

Approval for either of the two separation programs is based on the member's eligibility and qualification for the program. Eligibility requirements are based on years of service (YOS), rating and paygrade. There are exceptions to this rule concerning the Air Force which will be addressed later. Members must also be eligible for reenlistment, not on limited duty, not in training for an ineligible specialty code and not awaiting disciplinary action or administrative separation.

#### **E. AIR FORCE VSI/SSB IMPLEMENTATION**

Restructuring of the Air Force, according to some service leaders, was long over due. "The structure adopted 45 years ago no longer represented the most logical and efficient organization of either forces or missions". [Ref. 9] Unlike the Navy, the Air Force at the onset of the drawdown was facing a possible reduction in force (RIF), that is involuntary separation. The implementation of the VSI/SSB was definitely a life saver for the 'powers that be' in the Air Force. General Boles, Air Force Chief of Staff for Personnel stated,

Today's services are made up entirely of volunteers, most of whom want to stay for full careers. To some extent we are victims of our own success. We have worked hard to improve retention by making the Air Force an attractive way of life. These very efforts now complicate efforts to draw down the force. [Ref. 9:p. 40]

Although VSI/SSB was implemented, the possibility of a RIF was not totally eliminated. It was placed on hold awaiting the results of the programs. If the desired amount of takers did not come forth, the RIF was the second alternative.

The Air Force was concerned about end strength reductions as far back as 1986. They actually got a jump on the other services by implementing the following policies in 1986:

1. recruiting reduced
2. retirements accelerated
3. voluntary separations encouraged

General Merrill A. McPeak, USAF Deputy Chief of Staff, hoped that these efforts would continue to work and meet the drawdown requirements. In addition to the 1986 efforts, the Air Force in 1992 also implemented more policy changes:

1. lower high year tenure(HYT) points for top non-commissioned officers by 2-3 years,
2. E-8's must leave at 26 years
3. E-7's must leave at 23 years
4. E-5/6's must leave at 20 years
5. Chiefs still can stay up to 30 years, but not beyond
6. E-4's who have not made E-5 by 10 years must leave

These cutbacks definitely accounted for substantial losses in 1992. Total losses included approximately 900 senior officers through SERBS (Selective Early Retirement Boards), 1,500 E-4s (ten-year rule), 800 airmen denied reenlistment, and 2,900 NCO's due to the lowering of HYT points [Ref. 10:p. 38]. Still these losses were only a fraction of the losses needed.

The Air Force offered VSI/SSB to 300,000 personnel in hopes that at least 26,400 (21,600 enlisted and 4,800 officers), would accept. The Air Force's first deadline for

acceptance of applications was January 31, 1992. The second deadline was April 15, 1992. The target for offerings of VSI/SSB was directed towards E-4s (Senior Airmen<sup>1</sup>, Sergeant<sup>2</sup>), and E-5s with 9-19 years of service, most NCOs at bases marked for closure and most of the officer corps. In addition to these criteria, the programs were only offered to certain specialty codes.

As stated in the introduction, the Air Force utilized a tier system ranking from 1 to 5 to group eligible Air Force Specialty Codes (AFSC). AFSCs in tier one were not eligible for an exit bonus and were not vulnerable to a RIF. Those AFSCs in tier five were most susceptible to being forced out if they did not voluntarily leave. To maintain required manning levels, each specialty code had a maximum number of exit bonuses to be approved [Ref. 2]. The following tables list the specialties in the Enlisted Air Force and express the relation between AFSCs and tier groups.

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<sup>1</sup>After May 1, 1992, all promotions are to E-4 Sergeant.

<sup>2</sup>Noncommissioned officer(NCO) grades with E-4 Sergeant.

Table 2-4  
ENLISTED AIR FORCE  
OCCUPATIONAL SPECIALTIES  
(First two digits of AFSC)

<u>Code</u>	<u>Career Field</u>	<u>Code</u>	<u>Career Field</u>
10	First Sergeant	56	Sanitation
11	Aircrew Operations	57	Fire Protection
12	Aircrew Protection	59	Marine
20	Intelligence	60	Transportation
22	Geodetic	61	Commissary Services
23	Visual Information	62	Services
24	Safety	63	Fuels
25	Weather	64	Supply
27	Command Control Systems	65	Contracting
	Operations	66	Logistics Plans
30	Communications-Electronics	67	Financial
	Systems	70	Information
31	Instrumentation		Management
32	Precision Measurement	73	Personnel
34	Training Devices	74	Morale, Welfare
36	Wire Communications		& Recreation
	Systems Management	75	Education and
39	Maintenance Management		Training
	Systems	79	Public Affairs
40	Intricate Equipment	81	Security Police
	Maintenance	82	Special
41	Missile Systems Maintenance		Investigations
45	Manned Aerospace Maintenance	87	Band
46	Munitions and Weapons	88	Paralegal
47	Vehicle Maintenance	89	Chaplain
49	Communications-Computer		Management
	Systems	90-92	Medical
54	Mechanical/Electrical	98	Dental
55	Structural Pavements	99	Miscellaneous
			(Special Duty,
			Patients, Unclass.)

Source: Air Force Magazine/May 1992

**Table 2-5**  
**AFSCs BY TIER GROUP**

AFSC	Tier	AFSC	Tier	AFSC	Tier	AFSC	Tier	AFSC	Tier
112X0	1	277X0	1	454X2	4	545X1	5	871XOK	1
113X0B	1	303X1	1	454x3	2	545X2	5	871XOL	1
113X0C	2	303X2	1	454X4	2	545X3	5	871XOM	3
114X0	1	303X3	3	454X4A	2	551X0	5	871XON	3
115X0	1	304X0	1	454X5	2	551X1	5	871XOP	3
116X0	2	304X2	2	454X6	1	552X0	5	871XOR	4
117X0	1	304X4	1	455X0A	1	552X2	5	871XOS	5
118X0	1	304X5	2	455X0B	2	552X5	5	871XOT	5
118X1	1	304X6	1	455X1A	1	553X0	3	871XOV	5
118X2	1	305X4	1	455X1B	2	555X0	4	872X0	3
121X0	1	306X6	2	455X1C	5	566X0	4	881X0	1
122X0	2	309X0	1	455X2A	1	566X1	4	893X0	4
201X0	1	316X3	1	455X2B	3	571X0	3	901X0	1
201X1	1	324X0	1	455X2C	2	591X0	4	902X0	2
202X0	1	361X0	1	455X3A	5	591X1	4	902X0A	1
205X0	1	361X1	1	455X4	1	602X0	4	902X0B	1
206X0	2	362X1	2	455X6	5	602X1	5	902X2	1
207X1	4	362X3	5	456X0	4	603X0	5	902X2B	1
207X2	1	362X4	2	456X1A	2	605X5	5	902X2C	1
208X1A	5	391X0	2	456X1B	2	612X0	5	902X2D	1
208X2A	1	392X0	1	457X0A	1	612X1	5	903X0	1
208X2B	1	404X0	4	457X0B	3	623X0	5	903X1	2
208X2C	1	411X0	2	457X0C	2	631X0	5	904X0	1
208X2D	1	411X0A	2	457X0D	2	645X0	5	905X0	1
208X2E	1	411X1	2	457X0E	2	645X1	5	906X0	2
208X3A	1	411X1A	2	457X0F	2	645X2	2	907X0	1
208X3B	2	411X2	2	457X1	1	651X0	3	908X0	1
208X3C	2	411X2A	2	457X2A	1	661X0	2	911X0	1
208X3D	1	451X4A	5	457X2C	2	672X1	5	912X5	1
208X3F	1	451X4B	5	457X2D	2	672X2	5	912X5A	1
208X3J	1	451X5	5	457X2E	1	674X0	2	913X0	1
208X4A	1	451X6A	5	457X3A	1	702X0	5	913X1	1
208X4B	1	451X6B	5	457X3B	1	703X0	5	914X0	1
208X4C	1	451X7	2	457X3C	1	731x0	4	915X0	1
208X4D	1	452X1A	2	458X0	2	732X0	5	918X0	1
208X4E	1	452X1B	2	458X1	3	733X1	2	919X0	2
208X4G	1	452X1C	2	458X2	2	734X0A	1	924X0	1
208X4J	1	452X2A	1	458X3	2	734X0B	2	924X1	1
208X5A	1	452X2B	1	461X0	5	741X1	5	925X0	1
208X5C	1	452X2C	2	462X0	4	742X0	5	926X0	1
208X5D	1	452X3A	2	463X0	1	751X0	5	981X0	2
208X5E	1	452X3B	5	464X0	1	751X1	2	982X0	1
209X0	1	452X3C	5	465X0	1	753x0	5	99102	1
222X0	5	452X4A	2	466X0	1	753X1	2	99103	1
231X0	4	452X4B	2	472X0	5	791X0	3	99104	1
231X1	2	452X4C	5	472X1A	4	791X1	1	99105	1
231X2	2	452X4D	4	472X1B	4	792X2	3	99106	1
231X3	1	452X4E	4	472X2	4	811X0	4	99500	1
233X0	4	452X4F	4	472X3	4	811X2	4	99502	1
241X0	3	452X4G	4	472X4	5	811X2A	5	99503	2
242X0	2	452X4H	4	491X1	2	821X0	1	99504	2
251X0	1	452X4J	4	491X2	1	871X0A	1	99505	2
251X0A	1	452X4K	4	492X1	1	871X0B	5	99600	2

271X1	4	452X4L	4	492X2	2	871X0C	1	99602	1
271X2	2	452X4M	4	493X0	1	871X0D	1	99603	2
272X0	1	452x4Z	4	496X0	1	871X0E	3	99604	2
273X0	1	452X5	2	542X0	4	871X0F	5	99605	2
274X0	1	454X0A	4	542X1	4	871X0G	5	99606	1
275X0	1	454X0B	1	542X2	5	871X0H	3	997X1	2
276X0	1	454X1	2	545X0	5	871X0J	5	997X2	2
								997X3	1

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Source: Air Force

Some specialty codes fell under special categories. Those in 100X0 and 997X0 were not RIF-eligible, but sergeants and above could apply for an exit bonus if assigned to a base that is to close and if they were otherwise eligible. Those in 111X0, 341X2, 341X4, 341X6, 341X7, 455X3B, 456X2 and 99501 were not RIF-eligible, but sergeants and above could apply for a bonus if otherwise eligible. Those in 99006, 99007 and 99009, who are sergeants and above, could apply for a bonus if otherwise eligible. Those in 99000, 99001, 99002, 99005, 99008, 99101, 99107, 99108 and 99704 were not eligible for a bonus. [Ref. 2]

Most of the bonus offers went to sergeants and staff sergeants with 9-19 YOS. The same personnel with 9-14 YOS, would make up the RIF pool, if such action became necessary. If enough personnel did not pursue voluntary separation during the initial phase of offerings of the two programs, the pool would be expanded to other specialties and grades in an effort to avoid a RIF. [Ref. 2]



### **III. DATA AND METHODOLOGY**

Presented in this section are the details of the methodology used to model the stay/leave decision of enlisted Air Force personnel eligible for the VSI/SSB program, and to model the program choice (VSI/SSB) of those who opted for the separation bonus. The construction of the data set is discussed along with the behavioral models for these decisions. Additionally, the techniques used to estimate the models are discussed.

#### **A. DESCRIPTION OF THE DATA**

The data set was provided by the Defense Manpower Data Center (DMDC). It consisted of those enlisted Air Force personnel who were eligible for either VSI or SSB under the FY92 program. As explained in Chapter Two, the program initially was restricted by the Air Force to certain specialty codes (AFSCs), to certain paygrades (E-4s and E-5s), and years of service (9-19). It was later expanded to include more AFSCs. The DMDC data set contained 103,489 eligible personnel, 21.25 percent of the total Air Force enlisted population of 486,800 for FY92 [Ref. 8:p. 26]. Within the data set, 14,700 (14.2%) individuals accepted VSI or SSB, leaving 88,789 personnel who were eligible but did not accept a separation bonus. Among the acceptors, 13,553 (92.1%) chose

the SSB over the VSI option.

#### B. MODEL CONSTRUCTION

Binomial logit models were specified in an effort to determine what factors significantly affected the decision to accept or not accept a separation bonus and, among takers, which bonus to accept. Use of the binomial logit model vice the linear probability model avoided the major problems encountered when using OLS to estimate models with dummy dependent variables.<sup>3</sup> The results of a logit model, vice results of a linear probability model, are preferred by researchers due, in part, to the non-linear relationship between the explanatory variables and the dependent variable.

[Ref. 11:p. 520]

Avoiding the unboundness problem of the linear probability model made it advantageous to use a logit model based on the cumulative logistic function:

$$\ln \frac{P_i}{[1-P_i]} = B_0 + B_1 X_{1i} + B_2 X_{2i}$$

where  $P_i$  is the probability of satisfying the condition being tested for. In which case, any change in the explanatory

- 
- <sup>3</sup> 1. The error term is not normally distributed.  
2. The error term is inherently heteroskedastic.  
3. Predicted probability of the event is not bounded by 0 and 1.  
4. A linear relationship is imposed. [Ref.11:p.518]

variables (Xs) on the right hand side of the equation directly effects the 'logit,' or log of the odds of the event on the left hand side. In the first model, the observed value of the dependent variable equals 1 for and individual who voluntarily decides to separate, under one of the programs, and 0 if the individual decides not to take the separation program. In the second model, the observed value of the dependent variable equals 1 if the individual decided to take VSI and 0 if the individual decided to take SSB. To determine the probability that an individual will make the decision corresponding to  $Y_i = 1$ , the binomial logit model utilizes the following equation in its calculations;

$$P_i = \frac{1}{1 + e^{-(B_0 + B_1 X_{1i} + B_2 X_{2i})}}$$

where:

$e$  = base of the natural logarithm

$B_0, B_1, B_2$  = parameters to be estimated

$X_1, X_2$  = explanatory variables

Given the equation above,  $P_i$ s are the predicted probabilities of the condition being satisfied. In this case the model coefficients can be used to determine the impact that selected independent variables have on the dependent variable (log of the odds)<sup>4</sup> that the choice in question will be made.

[Ref. 11:pp. 518-519]

Model specification involves choosing the variables that

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<sup>4</sup> The ratio of the number of times a choice will be made divided by the number of times it will not.

are expected to have a significant impact on an individual's decision. Based on the literature review and the ACOL model, hypotheses were developed to predict the effect of each independent variable on the relevant choice variable. In comparing the results of the analysis of 1992 Air Force data in this thesis, with the analysis of 1992/93 Navy data, the variables selected were based on two previous studies: (1) *An Analysis of Enlisted Early Separation Under the Navy's VSI/SSB Program: The Impact of Eligibility and Program Benefits*, by S.J. Giarrizzo, Naval Postgraduate School, September 1993, [Ref.12] and (2) *Shrinking the Force: Effects of the Navy's Separation Incentive Program*, by Stephen L. Mehay and Mary Kirby, Naval Postgraduate School, 1993 [Ref. 13].

The equations below list the explanatory variables and the hypothesized signs of each variable. The hypothesized signs are based on the theoretical model and reasoning found in Mehay and Kirby [Ref. 13]. Table 3-1 displays the variable definitions and how they were coded.

$$\begin{array}{ccccccccccc} & & - & & + & & - & & - & & - & & - & & - \\ \text{TAKE} = f(\text{MINORITY}, & \text{AFQT}, & \text{MALE}, & \text{YOS}, & \text{GRADE}, & \text{MARRIED}, & \text{CHILD}, & \\ & + & + & & - & & + & & & & & & & & \\ & \text{MILSPS}, & \text{HSD}, & \text{UNEMP}, & \text{HITECH}) \end{array}$$

$$\begin{array}{ccccccccccc} & & - & & + & & - & & - & & - & & - & & + \\ \text{VSI} = f(\text{MINORITY}, & \text{AFQT}, & \text{MALE}, & \text{YOS}, & \text{MARRIED}, & \text{CHILD}, & \text{MILSPS}, & \\ & - & - & & - & & + & & & & & & & & \\ & \text{HSD}, & \text{NONGRAD}, & \text{UNEMP}, & \text{HITECH}) \end{array}$$

TABLE 3-1  
DEFINITION AND CODING OF  
VARIABLES USED IN LOGIT MODELS

<u>Dependent Variables</u>	<u>Definition</u>	<u>Values</u>
TAKE	Accept separation program	0=member accepted 1=did not accept
VSI	Choice of VSI or SSB	0=accepted VSI 1=accepted SSB
<u>Independent Variables</u>		
MINORITY	White or non-white	1=minority, 0=white
AFQT	AFQT score	Raw score, 1-100
MALE	Gender of individual	1=male, 0=female
YOS	Years of service	Years
HPG	High Paygrade E-6 or higher	1=HPG, 0=not
MARRIED	Marital status	1=married, 0=not
CHILD	Have Child/Children	1=child/children, 0=none
MILSPS	Military spouse	1=military spouse, 0=single or non- military spouse
NONGRAD	Non-high school grad	1=non-grad, college 0=grad
HSD	High school grad	1=high school grad 0=non-grad, college
UNEMP	Unemployment rate for home of record in 1992	Percentage
HITECH	Technical occupational specialties	1=hitech, 0=other

In both the "take" model and the VSI model the

hypothesized signs of the variables are similar. The MINORITY variable is expected to have a negative effect on TAKE as reenlistment rates for minority groups are generally higher than those for whites [Ref. 13:p. 45]. If the decision of minorities reflects fewer employment opportunities in the civilian labor market, this would suggest a greater likelihood of acceptance of the lump-sum vice the annuity.<sup>5</sup> The effect of MALE is hypothesized to be negative because of historically higher retention rates of men compared to women [Ref.13:p.46]. YOS and GRADE both are hypothesized to have negative coefficients. The closer an individual is to retirement and the higher his or her paygrade, the less likely he or she is to voluntarily separate. MARRIED and CHILD are hypothesized to have negative signs. These two variables reflect family responsibilities of the service member, and steady income would be extremely important top the individual.

[Ref. 13:p. 44] MILSPS (which=1 if the service member has a military spouse), is hypothesized to have a positive effect for a number of reasons. First, A military spouse is entitled to the same benefits as the member separating. Second, managing dual military career families is a difficult task. [Ref. 12:p. 30] Third, a spouse's steady income affords the separating member the opportunity to voluntary separate and begin a second civilian career. HITECH and HSD are both

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<sup>5</sup> The lump-sum payment could provide a means for a higher education awarding an individual the marketability needed in the civilian labor market.

expected to have positive signs due to increased job opportunities as a result of being highly skilled and better educated. Conversely, NONGRAD is expected to have a negative effect, in the VSI model. The variable UNEMP, the unemployment rate in the individual's home state, is expected to have a negative effect on separation. Most separating service members return to their home of record, i.e., their home state, to seek employment. Hence, the chances of finding a job may affect their decision [Ref.13:p.49]

#### **C. MARGINAL PROBABILITIES**

The next step after model estimation is to determine the individual effect of each explanatory variable, and its impact on the probability of accepting a separation bonus. Also the effect of each variable on the probability of accepting VSI over SSB needs to be determined, once the decision to accept a separation bonus is made. Unlike the Navy, the Air Force did not offer VSI/SSB in three different phases. For the Navy, phase three in 1993 included additional benefits that would affect the probability of accepting VSI. In addition to this, as mentioned earlier, Air Force enlisted personnel were facing a RIF if enough members did not voluntarily leave. For this reason, the Air Force offered the programs twice, with the first deadline date of application submission on 31 January 1992 and the second deadline on 15 April 1992. Although bonus eligibility expanded between the two deadline

dates to moving, deactivating or converting units, and to skills that were no longer needed, no benefits were added or taken away as with Phase 3 of the Navy's offering. Tables 3-2, 3-3 and 3-4 display the number of personnel submitting applications and those approved for VSI/SSB after the first deadline. As seen below, the number of submissions increased throughout 1992.

TABLE 3-2  
ENLISTED AIR FORCE  
VSI/SSB SUBMISSIONS  
(as of February 5, 1992)

	<u>VSI</u>	<u>SSB</u>	<u>TOTAL</u>	<u>APPROVED</u>
Sergeant(Sgt.)	81	1,409	1,490	N/A
Staff Sgt.	613	5,756	6,369	N/A
Technical Sgt.	21	96	117	N/A
Master Sgt.	5	13	18	N/A
<b>VSI/SSB TOTALS</b>	<b>720</b>	<b>7,274</b>	<b>7,994</b>	<b>N/A</b>

TABLE 3-3  
ENLISTED AIR FORCE  
VSI/SSB SUBMISSIONS  
(as of March 2, 1992)

	<u>VSI</u>	<u>SSB</u>	<u>TOTAL</u>	<u>APPROVED</u>
Sergeant(Sgt.)	165	2,443	2,608	1,511
Staff Sgt.	1,202	10,073	11,275	6,609
Technical Sgt.	64	179	243	116
Master Sgt.	11	32	43	20
Sgt. Master Sgt.	2	0	2	0
<b>VSI/SSB TOTALS</b>	<b>1,414</b>	<b>12,727</b>	<b>14,171</b>	<b>8,256</b>



TABLE 3-4  
ENLISTED AIR FORCE  
VSI/SSB SUBMISSIONS  
(as of March 9, 1992)

	<u>VSI</u>	<u>SSB</u>	<u>TOTAL</u>	<u>APPROVED</u>
Sergeant(Sgt.)	174	2,597	2,771	2,173
Staff Sgt.	1,310	10,951	12,261	9,509
Technical Sgt.	69	196	265	183
Master Sgt.	12	37	49	29
Sgt. Master Sgt.	2	0	2	2
<b>VSI/SSB TOTALS</b>	<b>1,567</b>	<b>13,781</b>	<b>15,384</b>	<b>11,896</b>

Source: Air Force Times, February 17, 1992, March 2, 1992, and March 9, 1992.

Note: N/A = not available

With respect to the logit models used in this analysis, the next step was to determine a means with which to measure the forecasting accuracy of the model. After estimating the binomial logit model, econometric analysis and hypothesis testing can be accomplished in much the same way as for linear equations. However, unlike OLS regression, interpreting the coefficients of logit models is different. Each coefficient represents the impact of a one unit change in the independent variable in question on the logit--the log odds of the event--not the probability itself as in the linear probability model [Ref. 11:p. 52].

In estimating a logit model, it is possible to define a "notional person." This allows for determining the change in the probability of taking a separation bonus when one independent variable is allowed to change, while holding all other variables constant at specified values. This same procedure calculates the change in the probability for the

VSI/SSB choice, again changing one independent variable and holding all others constant. The marginal probability calculations appear in Chapter IV. The notional person for the 'take' model from the entire population of eligibles, is defined to be a white male, who is married, has 2.5 children, and is a high school graduate. He is an E-6 or higher with 13 years of service, a score of 57 on the AFQT, and is not in a highly technical occupational specialty. The unemployment rate in his home state is 7.31.

The notional person in the VSI choice model is defined to be quite similar. He is also a white male, married with 2.5 children, a high school graduate, E-6 or higher, and not in a highly technical occupation. He has 11.5 years of service and a score of 56 on the AFQT. The unemployment rate in his home state is 7.28. All notional person attributes were based on the mean values of continuous variables and larger proportions for dummy variables.

#### IV. DATA ANALYSIS AND INTERPRETATION

##### A. Overview

This chapter discusses the results of the binomial logit models introduced in Chapter III. Models for both the "take" decision and the program "choice" decision (VSI versus SSB) are presented, where "take" refers to those personnel that voluntarily accepted a separation program, and "choice" refers to the decision of which program to accept, VSI or SSB. Relevant variables for each model and their effects on the selected dependent variable are included. A comparison of these results, using FY92 Air Force data, with the results obtained from FY92 Navy data reported in *An Analysis of Enlisted Early Separations Under the Navy's VSI/SSB Program: The Impact of Eligibility and Program Benefits*, by S.J. Giarrizzo of the Naval Postgraduate School [Ref. 12], is also included. The data reported for both Navy FY92 and Air Force FY92 are from the Defense Manpower Center (DMDC), and use similar variable definitions. This comparison will highlight differences and similarities if any, in the acceptance behavior of the two cohorts, enlisted Air Force and enlisted Navy during FY92, the first year of the bonus program.

This chapter also provides an analysis of the marginal probabilities associated with the independent explanatory variables in each model. This analysis allows for estimation

of individual effects of each explanatory variable on the probability of accepting a separation program and which program to accept, VSI or SSB.

#### **B. COMPARISON OF FY92 AIR FORCE AND NAVY**

The number of bonus eligibles for both FY92 enlisted Air Force and Navy personnel are displayed in Table 4-1. Succeeding tables, 4-2, 4-3, 4-4 and 4-5 compare the two groups, displaying means of relevant variables for the entire VSI/SSB eligible population, "TAKERS", "NONTAKERS" and for VSI takers. Logit models are run on the whole sample for enlisted Air Force personnel, all of whom are bonus eligible, for the take/not take decision. Logit models are also run on the choice decision (VSI/SSB), for a sample consisting of those personnel who are takers.

Table 4-1  
NUMBER OF PERSONNEL ELIGIBLE FOR VSI/SSB  
PROGRAM AND NUMBER (AND PERCENT)  
OF TAKERS BY FISCAL YEAR

	NAVY FY92 <sup>A</sup>	AIR FORCE FY92 <sup>B</sup>
NUMBER ELIGIBLE	31,872	103,489
NUMBER TAKERS (% of eligibles)	3,876 (12.2%)	14,700 (14.2%)
NUMBER ACCEPTING VSI (% of takers)	589 (15.2%)	1,326 (9.02%)
NUMBER ACCEPTING SSB (% of takers)	3,287 (84.8%)	13,374 (90.98%)

Source: <sup>A</sup> Estimates from Ref. 12, based on data provided by DMDC for FY92

<sup>B</sup> Figures based on data provided by DMDC for FY92

As displayed in Table 4-1, although the number eligible for Air Force greatly exceeds that of Navy, the percentage take rate and VSI selection rate for both the Navy FY92 data and Air Force FY92 data were similar. This is especially surprising given that Air Force personnel faced the threat of a RIF whereas Navy personnel did not. Of course, because the eligible Air Force population was so much higher, 11,000 more airmen separated. This was the major goal of the Air Force program--to reduce total end strength.

Table 4-2 displays the means of relevant variables for the bonus-eligible Navy FY92 and Air Force FY92 enlisted personnel. The sample of FY92 Air Force personnel appear to be more educated, by a slight margin. The proportion of high school graduates in the Air Force is 84.3 percent, slightly

higher than the 82.0 percent for the FY92 Navy sample. In contrast to this, the mean AFQT score is slightly lower for the Air Force, 57.0 percent compared to 58.5 percent for FY92 Navy. MINORITY representation reveals the largest difference between the two services--37.2 percent for the Navy and 23.9 percent Air Force.

TABLE 4-2  
MEANS OF RELEVANT VARIABLES FOR THE  
VSI/SSB PROGRAM ELIGIBLE POPULATIONS  
IN NAVY FY93 AND AIR FORCE FY92  
(in percent, unless noted)

VARIABLE	NAVY FY92 ELIGIBLE <sup>A</sup> (n= 31,872)	AIR FORCE FY92 ELIGIBLE <sup>B</sup> (n=103,489)
MINORITY	37.2	23.9
AFQT(raw score)	58.5	57.0
MALE	89.6	87.8
YOS (years)	12.9	13.0
HPG1 <sup>C</sup>	70.2	----
HPG2 <sup>D</sup>	----	39.5
MARRIED	79.2	82.3
CHILD(number)	1.5	3.1
MILSPS	5.4	10.9
HSD (high school grad)	82.0	84.3
NONGRAD (non grad)	14.1	00.7
UNEMP	7.4	7.31
HITECH	20.1	27.7

<sup>A</sup> Estimates from Ref. 12, based on data provided by DMDC for FY92

<sup>B</sup> Figures based on data provided by DMDC for Air Force FY92

<sup>C</sup> Represents the percentage of E-6 personnel

<sup>D</sup> Represents the percentage of personnel E-6 and higher

Other notable differences in Table 4-2 between the Navy and Air Force population are in the proportion high pay grade (HPG >= E-6), non-high school graduate (NONGRAD), military

spouse (MILSPS), and highly technical occupations (HITECH). The variable HPG is significantly lower for Air Force than Navy. This is based on the coding procedure for this variable. A majority of Air Force personnel that were eligible were E-5s, but in order to make a comparison with the results for Navy where HPG is coded for personnel in the paygrade E-6 only, the Air Force HPG variable is coded for E-6 and above. Although the Air Force targeted E-4s and E-5s with 9-19 years of service, after the initial offering of the programs the eligibility criteria were relaxed and expanded to more occupational specialties and groups. This included personnel from bases that were closing or scheduled to close, and also personnel who worked in occupations no longer deemed necessary by the Air Force. For this reason HPG2 is coded for E-6 and above, whereas in the Navy data HPG1 represents the percentage of E-6s.

The variable NONGRAD is much lower for the Air Force than the Navy, and the variable MILSPS, much higher. Even though the variable HITECH is higher for the Air Force than Navy, it is still relatively low. Perceiving the Air Force to be the most technical branch of the Armed Services would explain its very low make up of non-high school graduates and its limited offerings of a voluntary separation to personnel holding highly technical ratings. As will be explained in Chapter IV, those in HITECH occupations are less likely to separate. Performance of a frequency on educational certification

reveals that, from the total sample of Air Force eligibles, 87,335 (84.4 percent) are high school graduates. Further education, from one year of college up to receiving a doctorate accounts for an additional 15,343, leaving only 811 non-high school graduates. The variable MILSPS means that the individual having to make the decision to separate has a spouse who is also currently in the military, but not faced with the decision of voluntary separating. This variable will also be discussed in further detail in Chapter IV.

Table 4-3 displays the means of relevant variables used in the take and VSI acceptance models for those personnel who voluntarily separated in both the Navy FY92 and Air Force FY92. The variables that differed between the two services in Table 4-2 also differed in Table 4-3. However, one noteworthy difference in Table 4-3 is the HITECH variable. Only 29.2 percent of the personnel voluntarily separating have a highly technical rating. Referring back to Chapter II, personnel receiving specialized training may be more likely to work in a highly technical field. These personnel may receive less generalized training, which is more difficult to transfer to the civilian labor market [Ref. 6]. This factor may easily contribute to the decision of a service member in a HITECH rating not to voluntarily separate. However, there is an offsetting effect in that HITECH occupations are often those that are transferable to civilian jobs.



**TABLE 4-3**  
**MEANS OF RELEVANT VARIABLES FOR ELIGIBLE PERSONNEL**  
**VOLUNTARILY SEPARATED (TAKERS) IN FY92**  
(in percent, unless noted)

VARIABLE	NAVY FY92 SEPARATED <sup>A</sup> (n=3,876)	AIR FORCE FY92 SEPARATED <sup>B</sup> (n=14,700)
MINORITY	23.6	19.5
AFQT(raw score)	60.7	56.7
MALE	86.1	86.7
YOS(years)	12.7	11.5
HPG1	58.8	----
HPG2	----	79.3
MARRIED	76.5	79.2
CHILD (number)	1.5	3.0
MILSPS	7.0	10.7
HSD	78.1	91.6
NONGRAD	18.7	01.2
UNEMP	7.2	7.2
HITECH	N/A	29.2

Source: <sup>A</sup> Estimates from Ref. 12, based on data provided by DMDC for FY92

<sup>B</sup> Figures based on data provided by DMDC for Air Force FY92

Note: N/A = Not available

Table 4-4 displays the mean values of selected explanatory variables for Navy and Air Force FY92 eligible personnel who chose not to accept a separation bonus. With the exception of the expected differences of variables previously mentioned, the two samples are relatively similar.

**TABLE 4-4**  
**MEANS OF RELEVANT VARIABLES FOR**  
**STAYERS IN NAVY FY92 AND AIR FORCE FY92**  
**(in percent, unless noted)**

VARIABLE	NAVY FY92 STAYERS <sup>A</sup> (n=27,996)	AIR FORCE FY92 STAYERS <sup>B</sup> (n=88,789)
MINORITY	38.1	24.7
AFQT(raw score)	58.1	57.7
MALE	90.1	88.0
YOS(years)	12.9	13.2
MARRIED	79.6	82.8
CHILD (number)	1.5	3.1
MILSPS	5.2	11.0
HSD	82.5	83.1
NONGRAD	13.4	00.7
UNEMP	7.4	7.3
HITECH	N/A	27.5

Source: <sup>A</sup> Estimates from Ref. 12, based on data provided by DMDC for FY92

<sup>B</sup> Figures based on data provided by DMDC for Air Force FY92

Note: N/A = Not available

Table 4-5 displays the means of relevant variables for VSI takers. MINORITY representation is much lower among Air Force FY92 VSI takers compared to Navy FY92 takers, 14.0 percent versus 22.4 percent, respectively. This table and Table 4-3, means of relevant variables for eligible personnel voluntarily separated in FY92, display the largest differences in the MINORITY variable. Also, the percentage of MALES accepting VSI in the Air Force sample falls slightly below the Navy FY93 figure, 83.2 percent compared to 82.5 percent. Again, MILSPS and NONGRAD reveal the same differences in VSI take percentages.

**TABLE 4-5**  
**MEANS OF RELEVANT VARIABLES FOR VSI**  
**TAKERS IN FY92**  
(in percent, unless noted)

<b>VARIABLE</b>	<b>NAVY FY92 VSI TAKERS<sup>A</sup> (n=589)</b>	<b>AIR FORCE FY92 VSI TAKERS<sup>B</sup> (n=1326)</b>
MINORITY	22.4	14.0
AFQT	63.5	58.6
MALE	83.2	82.5
YOS	13.7	12.8
MARRIED	74.7	78.2
CHILD (number)	1.4	3.1
MILSPS	9.5	11.7
HSD	79.0	87.7
NONGRAD	16.5	00.4
UNEMP	7.2	7.2
HITECH	N/A	30.1

Source: <sup>A</sup> Estimates from Ref. 12, based on data provided by DMDC for FY92

<sup>B</sup> Figures based on data provided by DMDC for Air Force FY92

Note: N/A: Not available

### **C. LOGIT MODEL RESULTS**

The results of the Air Force FY92 "Take" model are shown in Table 4-6. The results are very close to the hypotheses developed in Chapter III. The variables are highly significant, with the exception of UNEMP. MINORITY is negatively significant, supporting the findings of Mehay and Kirby that reenlistment rates for minority groups are generally higher than whites [Ref. 13:p. 45]. MALE is negative and significant, reemphasizing that men historically, have higher retention rates than women. HPG has a very strong negative association in the take decision. This supports the

hypothesis that the closer an individual is to retirement, the less likely he or she is to voluntarily separate. MARRIED is significant and negative, but CHILD is positive. This indicates that having children positively influences an individual's decision to accept a separation bonus, but being married does not. HITECH and HSD are both positive and significant. The surprising result is of the variable NONGRAD, which has a strong positive effect on separation. This variable was hypothesized to be negative under the assumption that an individual not having a high school diploma would be more apt to stay in. From this model, not being a high school graduate positively influenced the decision to voluntarily separate. This is contrary to expectations, but has strong statistical significance. UNEMP and MILSPS are both statistically insignificant in this model at the .05 level.

TABLE 4-6  
LOGIT MODEL RESULTS ON DECISION TO TAKE  
A SEPARATION BONUS AMONG ELIGIBLE AIR  
FORCE ENLISTED PERSONNEL FY92

VARIABLE	LOGIT COEFFICIENT	T-Test	Pr> Chi-Square
INTERCEPT	-0.6149	- 5.993	0.0001
MINORITY	-0.4524	-17.499	0.0001
AFQT	-0.0039	-7.242	0.0001
MALE	-0.1807	-5.438	0.0001
YOS	-0.0379	-7.633	0.0001
HPG	-2.0660	-52.101	0.0001
MARRIED	-0.2772	-8.132	0.0001
CHILD	0.2476	6.785	0.0001
MILSPS	0.1360	3.355	0.0010
HSD	0.3432	9.571	0.0001
UNEMP	-0.0130	-1.706*	0.0886
HITECH	0.1316	5.901	0.0001
-2 LOG L 8167.076 with 11 DF			
Concordance Ratio = .721			
Sample Size=103,489			

Source: Data provided by Defense Manpower Data Center  
\* Indicates variables not statistically significant  
at .05 level

Table 4-7 displays a comparison of Navy FY92 and Air Force FY92 logit model results. As shown in this table, the results of the FY92 Air Force model differed from the FY92 Navy model, although the results closely approximate the hypothesized effects in Chapter III. The variables that actually come within close approximation of each other in the two models are MARRIED, MILSPS, UNEMP and HITECH. The signs were the same except for AFQT, which changed from positive in the Navy sample to negative in the Air Force sample.

TABLE 4-7  
COMPARISON OF TAKE/NOT TAKE LOGIT MODEL  
RESULTS FOR FY92 NAVY AND AIR  
FORCE FY92 SAMPLE

INDEPENDENT VARIABLE	FY92 NAVY [Ref. 12] <sup>A</sup>	FY92 AIR FORCE (TOTAL SAMPLE) <sup>B</sup>
MINORITY	-.565	-.452
AFQT	.004	-.003
MALE	-.365	-.180
YOS	-.019	-.037
HPG	-.680	-2.066
MARRIED	-.175	-.277
CHILD	.075	.247
MILSPS	.263	.136
HSD	.140	.343
NONGRAD	.495	----
UNEMP	.053	-.013
HITECH	.166	.131

<sup>A</sup> For a more indepth look at the Navy model results, see  
[Ref. 12]

<sup>B</sup> From column 1, Table 4-6

Table 4-8 provides the results of the Air Force FY92 VSI model.

TABLE 4-8  
LOGIT MODEL RESULTS FOR THE VSI VERSUS SSB DECISION  
FOR THE FY92 AIR FORCE SAMPLE OF TAKERS

VARIABLE	LOGIT COEFFICIENT	T-Test	P> Chi-Square
INTERCEPT	-.3756	-12.958	0.0001
MINORITY	-.434	-4.686	0.0001
AFQT	.004	2.542	0.0110
MALE	-.366	-3.780	0.0002
YOS	.212	18.291	0.0001
MARRIED	.094	0.918	0.3584
CHILD	-.319	-2.896	0.0038
MILSPS	-.225	-1.741	0.0816
HSD	-.461	-4.388	0.0001
NONGRAD	-1.639	-3.499	0.0005
UNEMP	-.046	-1.943	0.0520
HITECH	.032	0.466	0.6410

-2 LOG L 414.292 with 11 DF  
Concordance Ratio = .669  
Sample Size=14,700

Source: Derived from DMDC data on bonus eligibles Air Force  
FY92

Referring back to Chapter II, the hypothesized signs of the variables, Table 4-8 reveals that three fourths of the hypothesized signs are correct. With the exception of YOS and MARRIED, which were hypothesized to be negative and MILSPS which was hypothesized to be positive, the remaining explanatory variables' signs support the hypothesis. The variable revealing surprising results is YOS. The logit model shows that YOS has a positive influence on an individual's decision to accept VSI over SSB. This decision in part, may be based on two facts; (1) the Air Force offered the programs to service members with 9-19 years of service, and (2) out of the entire eligible population (103,489) there were only 811 non-high school graduates. The remainder of the sample included high school graduates and 15,343 service members who at a minimum had one year of college, with others having received doctorates. An individual, having already been to college would not need the lump-sum(SSB) to do the same. Perhaps this individual has a marketable degree and foresees no difficulty in gaining employment and therefore accepts VSI over SSB. Given the range in YOS, if the individual did have a college degree and was perhaps at the fifteen year point, he or she would probably start a second career and not need the lump-sum.

Table 4-9 provide a brief summary of the Air Force FY92 logit model results presented in table 4-8, along with selected results from the FY92 Navy model [Ref. 12:p. 51].

This allows for a comparison of variable significance, and whether the effect was positive or negative between the two "VSI versus SSB" model.

TABLE 4-9  
A COMPARISON OF VSI LOGIT MODEL COEFFICIENTS  
FOR THE FY92 NAVY MODEL AND FY92 AIR FORCE MODEL

INDEPENDENT VARIABLE	FY92 NAVY [Ref. 12]^	FY92 AIR FORCE
MINORITY	-.204	-.434
AFQT	.006	.004
MALE	-.283	-.366
YOS	.300	.212
MARRIED	-.272	.094
CHILD	.069	-.319
MILSPS	-.442	-.225
NONGRAD	-.203	-1.639

^ For a more indepth look at the Navy model results, see [Ref. 12]

Note: Variables not addressed in Giarrizzo are not reported in Air Force model.

As table 4-9 shows, the VSI logit model results differ greatly between FY92 Navy enlisted and the FY92 Air Force enlisted. The largest difference is accounted for by the variable NONGRAD: -1.639(Air Force FY92) and -.203(Navy FY92). Other variables that show large differences are MARRIED and CHILD. These differences in variable coefficients can be attributed to the less homogeneous nature of the VSI/SSB decision makers than that of the total sample of eligibles within each group. Variables that are fairly close in magnitude are AFQT, YOS and MALE.



#### D. MARGINAL PROBABILITY RESULTS

This section provides additional background in understanding how the attributes of the "Notional Person" are determined. Tables 4-10 and 4-11 provide results of the "notional person" calculations for both the TAKE and VSI logit models (Tables 4-6 and 4-8), using the sample of eligible Air Force enlisted personnel and the sample of VSI takers, respectively.

**TABLE 4-10  
OVERALL AND MARGINAL PROBABILITIES FOR 'TAKE' MODEL  
(AIR FORCE ENLISTED PERSONNEL FY92)**

DESCRIPTION OF INDIVIDUAL	PROBABILITY OF TAKING A BONUS (PERCENT)	MARGINAL PROBABILITY (PERCENT)
1. WHITE MALE, MARRIED, HSD (base case)	21.5	----
2. MINORITY MALE, MARRIED, HSD	14.8	-6.7
3. WHITE FEMALE, MARRIED, HSD	24.7	+3.2
4. WHITE MALE, SINGLE, HSD	26.5	+5.0
5. WHITE MALE, MARRIED, HPG, HSD	3.3	-18.1
6. WHITE MALE, MARRIED, NONGRAD	16.3	-5.2

Note: "notional" individuals have average AFQT scores, are E-5 or lower (unless noted), and face the average unemployment rate for the entire sample.

The results shown in Table 4-10 are quite interesting. The above calculations show that a minority male (all other variables held constant), has a low percentage of taking a bonus, 14.8 percent. This is a decrease of 6.7 percent from

the base case. This result is consistent with the logit model result where the MINORITY variable had the largest negative coefficient (-.4480). This result also lends support to the findings of Mehay and Kirby, in that minorities generally have a higher reenlistment rate than whites [Ref. 13]. Another variable showing a low calculated percentage of taking a bonus (3.3 percent), occurs for individuals in a high pay grade. This percentage decreases 18.1 percent from the base case. Referring back to Mehay and Kirby, the closer an individual is to retirement, the less likely he or she is to voluntarily separate [Ref. 13]. The coefficient of HPG lends support to the expectation that the typical individual eligible for a bonus is not the average young airman, but an individual having served numerous years. The chances of this individual finding employment comparable to his/her current salary, regardless of the unemployment rate, is very low. Therefore this individual, having been successful moving up the ranks into a high paygrade category, would be more inclined to stay in. Not being a high school graduate shows a 16.3 percent probability of taking a bonus, but as the attributes change from the base case, which is being a high school graduate, the percentage decreases 5.2 percent.

The highest calculated percentage of taking a bonus (26.5 percent) belongs to the notional person who is a white male, single, a high school graduate, but not in a high pay grade. Again this supports previous studies [Ref. 13], and also the

observation that an individual not having served many years, and who is young would be more apt to voluntarily separate, perhaps to use the monetary gains for further education.

As the attributes of a person changes, so does the probability of taking a bonus, as displayed by the marginal probability column. These results are expected and coincide with previous findings. Case 2 reveals that as race is changed from white to minority the percentage of taking a bonus decreases (-6.7 percent). As gender is changed from male to female as in Case 3, the percentage increases (+3.2 percent). When an individual is in a high paygrade, Case 5, the percentage decreases dramatically (-18.1 percent). Lastly, when the attribute is changed from high school graduate to non-high school graduate, the percentage of taking a bonus decreases (-5.2 percent). All of these results parallel the findings of Mehay and Kirby.

**TABLE 4-11**  
**VSI PROBABILITIES (Total and Marginal)**  
**AIR FORCE ENLISTED PERSONNEL**

DESCRIPTION OF INDIVIDUAL	PROBABILITY OF TAKING A BONUS (PERCENT)	MARGINAL PROBABILITY (PERCENT)
1. WHITE MALE, MARRIED, HSD (base case)	7.8	----
2. MINORITY MALE, MARRIED, HSD	5.2	-2.6
3. WHITE FEMALE, MARRIED, HSD	10.8	+3.0
4. WHITE MALE, SINGLE, HSD	7.1	-0.7
5. WHITE MALE, MARRIED, NONGRAD	1.6	-6.2

Note: "notional individuals" have average AFQT scores, are E-6 or higher, face the average unemployment rate for the entire sample, and have 11.5 YOS.

As displayed in both Tables 4-10 and 4-11, women having the same attributes as men, have a higher calculated probability of both separating and taking the VSI over the SSB. As hypothesized, the effect of MALE is negative, contributing to historical fact of higher retention rates for men than women. The lowest calculated percentage from this sample again goes to the individual not having a high school diploma. This individual is a TAKER, and a taker of VSI. This is an unexpected result and contrary to previous discussion, concerning using the monetary gain for further education, which would suggest SSB would be the better decision. Even still, the percentage is quite low. As in the TAKE probability calculations, the change to MINORITY ranks second to last in the VSI probability results also.

As explained for the take model, changing an individual's attributes changes the probability of making some choice. The following marginal probabilities reflect the VSI decision over SSB. As the attributes change from Case 1 to Case 2, white to minority, the percentage of accepting VSI decreases (-2.6 percent). If the individual is a female, the percentage increases (+3.0 percent). Finally, if the individual is not a high school graduate the percentage decreases (-6.2 percent). Having accepted a separation program, an individual who is not a high school graduate would be more apt to chose SSB over VSI. SSB provides a lump-sum payment up front, which can be used for the completion of high school degree or equivalent and follow-on college education.

## **V. CONCLUSIONS AND RECOMMENDATIONS**

### **A. CONCLUSIONS**

This thesis conducted an analysis of the voluntary separation behavior of enlisted Air Force personnel during FY92, using a data set of all personnel eligible for the separation bonus. The thesis extended previous research and analyses concerning the FY92 and FY93 VSI/SSB Navy programs conducted by Stephen L. Mehay and Mary Kirby, and by S.J. Giarrizzo. [Ref. 13, 12] As found in the analysis of this thesis, and by the analyses of both FY92 and FY92 Navy results, certain background variables significantly influence an individual's decision to accept a voluntary separation bonus. Comparisons of logit model results between FY92 Navy and Air Force reveal consistency in the effect and significance of the explanatory variables. These results indicate that similar decisions concerning voluntary separation were made by two separate cohorts (Navy and Air Force), for the same fiscal year (FY92).

The hypothesized signs of the variables, displayed in Chapter III, on both the take decision and the VSI decision were closely supported. Referring back to Question 3 of the thesis, the accuracy of the predicted signs of specified explanatory variables provides a framework to predict the "take" behavior by future cohorts.

The focus of Congress on the Department of Defense becomes more intense as budget cuts across the board cause departments under DoD to tighten their belts. This includes a decrease in allocated funds and personnel. This alone calls for further VSI/SSB offerings. On the other hand, more opportunities are being opened up for women and minorities as the forces maintain, and in some cases, increase the representation thereof. Having a model that predicts the likelihood of acceptance, provides a means by which DoD can forecast the results of further use of the Voluntary Separation Incentive and the Special Separation Bonus as cost effective force shaping tools.

#### **B. RECOMMENDATION FOR FURTHER RESEARCH**

It was not in the scope of this thesis to determine the effects of accepting a separation program when certain other factors play a part. For instance, with the threat of a potential RIF, an individual's decision to separate may have been made premature. Personnel that were in the non-critical occupational specialties and were the target for a potential RIF, may have been more apt to voluntarily separate. That is, they would avoid taking a chance of being forced out with a lesser amount of severance pay and would be likely to accept one of the separation programs. On the other hand, personnel that were eligible and met the eligibility requirements who would have taken a voluntary separation, but were denied

acceptance because of the importance of their occupational specialty to the Air Force, were not necessarily guaranteed a minimum twenty-year retirement. They were only exempt from the possible ensuing RIF. The decision making process would also undoubtedly be influenced if the restrictions of acceptance for non-eligible occupational specialties were relaxed. Widening the offerings to all occupational specialties, and then ~~guaranteeing~~ a minimum-twenty year retirement to those in the previous non-offered specialties codes, could possibly enhance the likelihood more personnel (in the critical specialties), would not voluntarily separate.

Information from Air Force and Navy separation questionnaires may also be valuable in determining differences in factors that significantly influenced the separation decisions in the two somewhat different environments. Special questions would have to be constructed on the exit questionnaires. However, the effort taken to construct the questions may be worth the extra cost in terms of the information elicited on the effectiveness of the VSI/SSB program when offered to personnel to leave, who would otherwise have stayed.



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4. Professor Gregory Hildebrandt, Code AS/Hi Naval Postgraduate School Monterey, California 93943-5000	2
5. LT D.A. Sewell 913 Sir Lancelot Dr. Chesapeake, Virginia 23323	4